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# Care Team Utilization of the GINA Guidelines to Improve Quality of Pediatric Asthma Care

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Care Team Utilization of the GINA Guidelines to Improve Quality of Pediatric Asthma Care

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### Abstract

*Background:* Asthma is a chronic condition that affects millions of people, many of whom are children. There is a significant amount of evidence detailing best step-by-step treatments based on severity, yet many children still have uncontrolled asthma. The comprehensive management of asthma is essential to improve health outcomes for children with asthma.

*Methods:* This project evaluated the implementation of the Global Initiative for Asthma (GINA) guidelines and assessed the barriers and facilitators present in a pediatric clinic which impact care delivery. This project involved the implementation of an educational intervention based on the GINA guidelines to facilitate a team-based approach to asthma management.

*Results:* Eight staff members participated in the project. The most significant changes were 75% of staff reported an increase in their knowledge of the GINA guideline recommendations, staff reported a 25% increase in team member participation in asthma care, and staff reported a 12.5% increase in their feelings of support for the use of team-based implementation of the GINA guidelines from leadership. The results of this quality improvement project support the use of Roger's Diffusion of Innovations model as a theoretical framework to support implementation of a team-based approach to the use of the GINA guidelines in a pediatric clinic.

*Conclusions:* Education on evidence-based guidelines improves clinic staff knowledge and utilization of the guidelines. However, factors such as leadership involvement, clinic infrastructure, and standardized clinical tools are essential for successful implementation of a team-based approach to asthma management.

***Keywords:*** Asthma, Pediatric Asthma, Team Based Asthma Care, Evidence Based

*Treatment*

## **Introduction**

Asthma is a chronic condition that affects millions in the United States and around the world (Global Initiative for Asthma [GINA], 2016). The prevalence of asthma is increasing globally, and now 9.6% of children have asthma, and this rate soars to 19% in African American and socially disadvantaged youth (Centers for Disease Control and Prevention [CDC], 2011). Asthma is defined by airway inflammation and symptoms of asthma include cough, wheezing, shortness of breath, chest tightness and variable expiratory airflow limitation (GINA, 2016). While this appears to be a clear definition of asthma, there are many asthma phenotypes, and each phenotype has distinctive features which should be addressed through treatment (GINA, 2016).

## **Background**

The Global Strategy for Asthma Management and Prevention aims to make diagnosis and comprehensive management of asthma clear and easy to use in the clinic setting (GINA 2016; (Reddel, Levy, & Global Initiative for Asthma Scientific Committee and Dissemination and Implementation Committee, 2015). The recommendations in the GINA guidelines focus on diverse age groups, and the guidelines continue to be updated annually with the current evidence (GINA, 2016). To address the inadequate management of pediatric asthma, the use of evidence-based guidelines is important to improve management and improve outcomes. The evidence also supports a comprehensive team based approach to the implementation of the GINA guidelines to improve individual and population health as well as reduce both economic and health related burdens of chronic, uncontrolled asthma (Graham & Eid, 2015; Lob, Boer, Porter, Nunez, & Fox, 2011; Loftus & Wise, 2015).

**Problem Statement**

The risk of asthma among pediatric patients in the United States is indicated by high rates of hospitalization, missed school days, frequent exacerbations, and more frequent emergency department visits. Patients with poorly controlled asthma have decreased use of controller medications, lower quality of life, decreased understanding of how to use medications correctly, and lack of access to individualized asthma action plans. These challenges result from a lack of a comprehensive team-based approach to understand and implement evidence-based asthma management.

The purpose of this project is to implement the GINA guidelines for asthma management in a pediatric clinic and to identify the barriers and facilitators to integrating the GINA guidelines into a pediatric clinical practice and then develop a clinic-based team educational campaign to reduce barriers to integration. The educational piece of the intervention will include tools and role clarity for the team members to successfully implement the GINA guidelines in clinical practice.

**Organizational “Gap” Analysis of Project Site**

Several clinical interventions are suggested to successfully implement the GINA guidelines in clinical practice. The strategies needed for successful implementation of the GINA guidelines include assessing the asthma severity at each visit with the use of Asthma Control Test (ACT) or Test for Respiratory and Asthma Control in Kids (TRACK) assessment tool, managing asthma based on symptoms and control, updating the asthma action plan at each visit, assessing for environmental factors, assessing pulmonary functioning using spirometry, assessing for self-monitoring (Gina, 2016). To achieve optimal control of asthma symptoms, the use of Registered Nurse (RN) visits, intensive patient and family educations, and patient

recording and reporting of triggers and symptoms have shown to improve asthma related outcomes (GINA, 2016).

Currently, the clinic does not use any tests to assess control of asthma in the clinic. It does not routinely make management decisions based on standard asthma control questions or patient reported symptoms and patients are not given an asthma action plan which would empower them to self-manage their asthma. Spirometry is not presently used to assess pulmonary functioning and no investigation of environmental factors for asthma triggers has been identified. The clinic does not offer RN visits and patients are not educated about how to monitor their level of asthma control and symptoms. The research suggests that barriers to integration of clinical practice guidelines include: lack of knowledge, lack of policies that describe what to use and when, lack of a team-based approach to asthma management leaving providers to feel rushed with no time for thorough assessment, lack of confidence in the guidelines and their usefulness for the population, and lack of availability of services (Gerrish et al., 2007; Kenefick & Fleishman, 2008; McEvoy, Williams, & Olds, 2010).

Additionally, the clinic has no comprehensive team-based approach to asthma management. The Medical Assistants, Licensed Practical Nurses, Registered Nurses, and medical secretaries do not have a clear understanding of evidence-based recommendations or their role in improving asthma management in the clinic. Standard forms are not available for education or symptom assessment and provide no focus on self-management, all of which are strongly recommended in the literature (F. M. de Benedictis & Attanasi, 2016; Graham & Eid, 2015; Janevic et al., 2016; Kuethe et al., 2013; Szeffler, 2015)..



### **Review of the Literature**

A comprehensive literature search was conducted using PubMed, CINAHL, and Google Scholar. The medial subject headings used were “pediatrics”, “asthma”, “disease management” and “review”. A search of the Cochrane Database was also conducted using the search terms “pediatric asthma management.” The inclusion criteria for all articles included those written in English, those that were peer-reviewed, those that focused on the pediatric population ages 0-18, and those written after 2012. The clinical guideline was chosen through a search of asthma clinical practice guidelines located in the National Guideline Clearinghouse, and a Google search using the search term “asthma practice guidelines”. The Global Strategy for Asthma Management and Prevention was chosen due to the comprehensive nature of the guidelines, the focus on the pediatric population, and the strength of the research used to develop the guidelines (GINA, 2016).

A total of fifty-seven articles met the inclusion criteria and were reviewed. Thirty-two articles were included in this review. Six of the articles are randomized controlled trials (RCTs), three are systematic reviews and twenty-three articles are Cochrane reviews that evaluate the current recommendations in the GINA guidelines including team-based care. There is emerging evidence in the six RCTs evaluated, but are not included in the guidelines, as these strategies are being used in clinical settings. The review addresses assessment and management strategies that improve outcomes and reduce the need for oral steroids, emergency department visits, and hospitalizations. The strength of the evidence used in this review ranges from level III to Level Ia with majority of the evidence being Level Ib (Melnik & Fineout-Overholt, 2011).

### **Assessment**

The first step in asthma management is assessment of control (GINA, 2016). Assessment of asthma control should include both the assessment of lung function and the experience of asthma related symptoms. This approach allows for assessment of control, as well as improved identification of areas for further intervention to improve control in self-management programs (Reddel et al., 2015; Voorend-van Bergen, Vaessen-Verberne, de Jongste, & Pijnenburg, 2015). While none of the control questionnaires are superior to others, each provides a consistent way for clinicians, patients, and families to assess control with short recall periods. Also, they quickly identify worsening symptoms, thus prompting treatment of acute symptoms (Dinakar & Portnoy, 2014; Reddel et al., 2015; Voorend-van Bergen et al., 2015). While it does not matter which questionnaire is used to assess symptoms, the important factor is for patients and families to have frequent contact with nurses or providers to identify symptoms and make adjustments in medications as needed (Kew & Cates, 2016; Kuethe, Vaessen-Verberne, Elbers, & Van Aalderen, 2013).

No differences are noted between the care that a patient receives from a nurse-led clinic versus a traditional clinic. There is also no difference in care received in remote check-ups, but the consistent driver to control is constant engagement with the clinical team (Kew & Cates, 2015; Kew & Cates, 2016; Kuethe et al., 2013). Family-centered care that included assessment of emotional and environmental triggers is essential for effective assessment of asthma symptoms (Findley et al., 2011; Hollenbach & Cloutier, 2015; Kuhlthau et al., 2011; Lob et al., 2011; Szeffler, 2015; Wood, Miller, & Lehman, 2015). The use of a comprehensive, team-based approach to asthma management is a way to reduce the healthcare, economic, and societal burden of asthma in the population (F. M. de Benedictis & Attanasi, 2016; Graham & Eid, 2015; Szeffler, 2015). While there has been no difference between the care provided in nurse-led clinics

for exacerbations, symptoms control, or disease severity, the care coordination in the team-based care model provided improves perceived quality of life (QOL), reduces emergency visits, improves population health, and reduces the overall health and economic burden of asthma (F. M. de Benedictis & Attanasi, 2016; Graham & Eid, 2015; Janevic et al., 2016; Kuethe et al., 2013; Szeffler, 2015).

## **Management**

While frequent, standardized assessment is essential to asthma control, management of asthma is more complex. The GINA (2016) guidelines recommend treatment decisions based on assessment of symptom severity and disease status. Inhaled corticosteroids (ICS) have been a mainstay of maintenance therapy, but there have been questions regarding the use of leukotriene antagonists (LTRA), long-acting beta agonists (LABA), oral steroids, and increased versus static dosing of ICS in pediatric asthma management. In addition to pharmacologic therapies, GINA (2016) recommends symptom-directed therapy, asthma action plans, and self-management education regardless of asthma severity. These strategies are best employed in a team-based model of care that increases patient-provider/team communication, patient self-efficacy, and treatment adherence (Findley et al., 2011; Hollenbach & Cloutier, 2015; Khalid, 2015; Lob et al., 2011; Pijnenburg et al., 2015; Szeffler, 2015).

The Global Initiative for Asthma (2016) recommends the use of LTRAs in pediatric patients who are not controlled on an ICS alone. LTRAs have been shown to be safe and have fewer side effects when compared to inhaled corticosteroids; however, they do not reduce hospitalizations, emergency department visits, or reduce the need for oral corticosteroids (Chauhan & Ducharme, 2012; Chauhan, Ben Salah, & Ducharme, 2013; Chauhan & Ducharme, 2014; Watts & Chavasse, 2012). While there have been limited benefits with the use of LTRAs,

benefits have been documented for persistent asthma and preventing exercise induced bronchospasm when combined with an ICS (Chauhan & Ducharme, 2012; Chauhan & Ducharme, 2014).

For those that are over the age of twelve, the treatment recommendation for those not controlled on an inhaled corticosteroid is the addition of a Long-acting Beta Agonist (GINA, 2016). However, for those younger than twelve, LABAs are not recommended but continue to be used in clinical practice (Cates, Oleszczuk, Stovold, & Wieland, 2012). Current research is conflicted about the use of LABAs in pediatric patients and complicates treatment decisions. To date, LABAs, with or without the use of inhaled corticosteroids, increase the risk for adverse events and hospitalizations, but in poorly controlled pediatric patients, the benefits may outweigh the risks (Cates et al., 2012; Chauhan, Chartrand, Ni Chroinin, Milan, & Ducharme, 2015).

For pediatric patients over the age of twelve, the addition of LABAs, either in a Single Maintenance And Reliever Therapy (SMART) or in addition to an inhaled corticosteroid, improves overall lung function, can improve adherence to pharmacologic therapy, and can result in fewer exacerbations that require oral steroids or hospitalizations (D. de Benedictis & Bush, 2016; Dinakar & Portnoy, 2014; Kew, Karner, Mindus, & Ferrara, 2013). One of the biggest challenges with starting a LABA in the pediatric population is the lack of research to support the discontinuation of therapy (Kew, Beggs, & Ahmad, 2015). This creates concern, as the guidelines recommend that treatment be reduced once control is maintained for three months (GINA, 2016). With the controversy over the use of LABAs in pediatric asthma, providers must determine the appropriate use of inhaled corticosteroid especially in those under the age of 12.

The management of exacerbations includes the use of Short-Acting Beta Agonists (SABA), oxygen, inhaled corticosteroid, and oral steroids (GINA, 2016). Inhaled corticosteroids

are often dosed in a static or stable method (GINA, 2016). The research supports the use of symptom driven inhaled corticosteroid use and intermittent ICS use at the first sign of exacerbation (Chong, Haran, Chauhan, & Asher, 2015; Dinakar & Portnoy, 2014; Kew, Quinn, Quon, & Ducharme, 2016). The use of symptom driven and intermittent inhaled corticosteroid has been associated with increased asthma control, increased quality of life in preschool children, and decreased need for oral corticosteroids without increasing side effects (Chong et al., 2015; Dinakar & Portnoy, 2014; Kew et al., 2016). Oral steroids are currently recommended for symptoms that are severe or continue longer than 48 hours (GINA, 2016). The research is still lacking regarding the duration of treatment, the amount of oral corticosteroid recommended, and whether dexamethasone or prednisolone should be used (Normansell, Kew, & Mansour, 2016). For this reason, it is suggested to follow the recommendations in the GINA guidelines (Normansell et al., 2016; Reddel et al., 2015).

In addition to the standard treatments for asthma management, Vitamin D is being researched for its role in exacerbations and control (GINA, 2016; Martineau, Takeda, Nurmatov, Sheikh, & Griffiths, 2015). While low serum Vitamin D increases the risk for exacerbations and the severity of exacerbations, this treatment is not currently recommended in the guidelines to assess for or replace Vitamin D (GINA, 2016). Current research indicates that people supplemented with Vitamin D experienced fewer exacerbations, needed fewer oral corticosteroids, and had fewer hospitalizations (Martineau et al., 2015). While the pharmacological management of asthma is chronically and acutely complicated, it is essential for self-management education, asthma action plans, and symptom monitoring to be instituted for all patients with asthma (GINA, 2016; D. de Benedictis & Bush, 2016; Reddel et al., 2015).

There are several recommendations for effective evaluation and management of pediatric asthma, and the most important factor is the use of team-based care to increase adherence to clinical practice guideline recommendations and patient adherence (Findley et al., 2011; Kuhlthau et al., 2011; Lob et al., 2011; Szeffler, 2015). The use of a comprehensive team-based approach increases patient self-management confidence, increases understanding of disease management strategies, decreases the economic and social burden of asthma, and reduces asthma exacerbations (F. M. de Benedictis & Attanasi, 2016; Graham & Eid, 2015; Pijnenburg et al., 2015). While team-based asthma care is essential to providing comprehensive evidence-based care, barriers do exist that impede the use of evidence-based guidelines by a care team. These factors include lack of role clarity, lack of understanding of the recommendations, fear of increased work load, fear of how the new method will fit into the clinic work flow, and educating patients about team based care (Anderson & Szeffler, 2015; Findley et al., 2011; Hollenbach & Cloutier, 2015; Kuhlthau et al., 2011; Lob et al., 2011; Mudd, Leu, Sloand, & Ngo, 2015).

### **Evidence Based Practice: Verification of Chosen Option**

This quality improvement project will address the existing barriers to implementation of the GINA guidelines in a pediatric clinic. The GINA guidelines recommend using a team-based approach as a method to improve the quality of care provided to patients and their families and reduce the burdens associated with this chronic disease. Evidence shows that consistent use of guideline-based asthma management improves population health, reduces health disparities, and reduces economic costs (Graham & Eid, 2015; Lob, Boer, Porter, Nunez, & Fox, 2011; Loftus & Wise, 2015).

This project will utilize a modified version of the Barriers Scale, The World Health Organization Hand-washing Scale, and Team Roles assessment which will be combined into a

single scale to measure barriers, role clarity, and current functioning (Funk, Champagne, Wiese & Tornquist, 1991; Upton & Upton, 2006; Weng et al., 2013; World Health Organization (WHO), 2009). The information gained from the questionnaires will be used to develop educational sessions for the staff. These educational sessions will be conducted to address barriers to guideline use, guideline recommendations for practice, and how to utilize the whole team to improve outcomes. During the educational sessions staff members will be asked for their views and perceptions about how to effectively implement the GINA guideline recommendations. This project aims to improve the utilization of the GINA guideline recommendations in the pediatric clinic.

### **Theoretical Framework/Evidence Based Practice Model**

The theoretical framework that supports the development of this project is the Roger's Diffusion of Innovations Model (Appendix A) (Carlson, 2009). This model explains that there are different time points in which people will adopt change. This model underscores the challenges that people face at different stages while attempting to implement innovations or make changes to existing processes. The Diffusion of Innovations Model utilizes a saturation point of information which improves the likelihood that changes will be implemented and sustained in the clinic setting (Carlson, 2009).

This model is separated into five stages (Table A.1). This DNP project will focus on the first three stages of Roger's model. In the first stage, the knowledge stage, the clinic staff will be exposed to the GINA guidelines during educational sessions. The clinic staff includes all staff, both permanent and contract, who work in the pediatric clinic regardless of their job title. These education sessions discussed how the use of the GINA guidelines will impact care provided to the patient population. In the second stage, the persuasion stage, the staff were educated about

their role in asthma treatment. The education on staff roles was provided during education sessions. The staff were educated on specific recommendations in the GINA guidelines, and how the use of the recommendations will impact the patient outcomes. During the educational sessions, each discipline was educated on their role in asthma management, and these roles were identified and outlined during the educational sessions. In the third stage, the decision stage, staff questions and challenges were addressed.

The staff had time during each education session to provide feedback about potential challenges and answered the survey questions which helped to identify areas of concern in the clinic including support from supervisors. The fourth stage and the fifth stage, the implementation stage and the confirmation stage, occurred at the completion of all of the educational sessions and are not included in this DNP project. These stages are part of the sustainability plan and will require time to be successful. During these stages, EHR templates will be revised, and clinic flow will be observed to ensure effective team implementation of the GINA guidelines. Both stages will require time with team members to ensure role clarity, and to trouble shoot any challenges that arise. There will also be objective data that can be obtained regarding improvement in control of asthma symptoms, reductions in hospital admissions and emergency department visits, as well as improvements in quality of life for patients and their families. At the completion of the final stage, the confirmation, the team members will understand their role in implementation of the GINA guidelines, and the flow in the clinic will be smooth. At the completion of the DNP project, the staff will feel confident in their abilities to positively impact patient care, and will see the value in continuing the implementation of the GINA guidelines.



### Goals, Objectives and Expected Outcomes

The goal of this project was to improve the quality of asthma care in a Pediatric Primary Care Clinic (Table 1). This project used the GINA guidelines to enhance care delivery in a team-based setting. This DNP project educated the staff on the GINA guideline recommendations, each team member's role in asthma care delivery, and education regarding how changing asthma care delivery impacted the patients and their families.

Table 1

#### *Project Goals*

Objective	Outcome
The staff of the pediatric clinic will have a thorough knowledge of the recommendations of the GINA asthma management guidelines.	75% of staff reported an increase in their knowledge of the GINA guideline recommendations.
The staff in the pediatric clinic will report increased team member participation in asthma management	The staff reported a 25% increase in team member participation in asthma care
The staff in the pediatric clinic will report support from clinic leadership for implementing team-based use of the GINA guidelines.	The staff reported a 12.5% increase in their feelings of support for the use of team-based implementation of the GINA guidelines from leadership.

### Project Design

This project was a quality improvement project designed to improve the use of the GINA Guidelines in a pediatric clinic. The project evaluated the barriers to the design and implementation of a comprehensive team-based approach to asthma management using a pre-test post-test design. The data gained from the pre-test was used to develop an educational campaign to address the barriers and facilitators of team-based implementation of the GINA guidelines in the clinic. After the completion of the educational sessions, the post-test was administered to evaluate the effectiveness of the educational session.

**Project Site and Population**

This project took place in a pediatric clinic in urban Phoenix, Arizona. Approximately 75 percent of the patients are from minority groups, and live in the poorest communities in Phoenix with exceptionally low literacy rates. Approximately 90 percent of patients are on Medicaid, and the remainder have private insurance. The majority (95 percent) of the families live in the Phoenix-Metro area, and the remainder are from smaller communities up to 1.5 hours away. Most of the children are from single parent homes where extended family are often relied upon to provide a substantial amount of care.

The clinic supported dedicated time for educational sessions, and substantial time allotted for implementation of team-based care in the clinic. The participants worked together to take the information in the educational sessions and implement the recommendations in the clinic. The time required for integration of team-based initiatives in the clinic was dependent on the level of engagement from all team members, including those that did not participate in the educational sessions and/or surveys. The educational sessions were available to all staff, regardless of their participating in the surveys and were supported by clinic administration and leadership.

**Description of the group, population or community.** The pre-test was sent via weblink to all staff who met inclusion criteria in the clinic on three occasions. Inclusion criteria in the project sample population included employees that provide direct patient care services in the pediatric clinic either on a full- or part-time basis. The exclusion criteria included non-employees who volunteer in the clinic in a non-clinical capacity, staff of the organization that did not work in the pediatric clinic on an either full-time or part-time basis, and those employees who served a purely administrative function in the clinic and had no patient contact.

The data collected included the staff's understanding of current clinical practice guidelines, understanding of current practice recommendations for asthma, questions about their understanding of their role in asthma management, and barriers and facilitators in practice. The assessments/questionnaires were collected anonymously and limited demographic data was obtained. All data was de-identified to prevent individual respondents from being identified. All data was collected using SurveyMonkey, and the settings were changed to ensure that no IP address data was collected. All data was stored on the SurveyMonkey server, and only the DNP student had the password to access to the data.

**Organizational analysis of project site.** The clinic provides full-spectrum pediatric primary care within the clinic. The clinic has open-access scheduling, meaning that patients can be seen on the day they call or the following day for both acute and chronic complaints. The clinic appointments are fifteen minutes in length except for new Attention Deficit Hyperactivity Disorder appointments, which are 30 minutes in length. The clinic is on a different server from the main hospital and other clinics on the campus allowing for multi-user log-ins on the system. The clinic is open Monday thru Thursday from 8 am until 7 pm and on Fridays from 8 am until 5 pm. The clinic is open on the 2<sup>nd</sup> and 4<sup>th</sup> Saturday's of the month from 8 am until 3 pm. The clinic has access to 24/7 laboratory, radiology, and respiratory therapy services inside the main hospital.

The DNP student interacted with the staff of the clinic with the permission of the Chief of Pediatrics, the nursing supervisor, and the clinic practice manager setting up a schedule with the clinic leadership for the distribution of the assessments, the timing of the educational sessions, and the distribution of the follow-up assessments. This project did not utilize any direct patient interactions; thus, clinic flow and patient care were not impacted by the project.

**Setting facilitators and barriers.** The barriers to successful implementation of this quality improvement project included difficulty finding time to educate all team members together, resistance to new ideas that impact clinic flow, and understanding that change is difficult for most people. Additionally, many staff members were working in other facilities to help with disaster relief. The facilitators present in the clinic that increased completion of the project included staff who are dedicated to taking care of pediatric patients and their families and who recognize the need for change and improvements related to asthma care, and the clinic leadership who engaged and advocated for change in caring for patients with asthma and their families.

### **Implementation Plan/Procedures**

The implementation plan for the project included several steps. The first step in the implementation of the project was development of the pre-test/post-test surveys with the Chief of Pediatrics and DNP Project Mentor. The next step in the implementation plan was staff participation recruitment via email and in-person communication. Participation was voluntary and there were no incentives for participation. The DNP student presented the project to the staff including the purpose of the project and the plan for the educational sessions. The pre-test survey was sent out via SurveyMonkey every Monday for three weeks in October 2017.

After the initial survey results were received, the DNP student analyzed the data looking for areas of staff identified weaknesses, and this information was used to develop eight one-hour education sessions. The education session (Appendix B) occurred weekly over a period of eight weeks for one hour. Each educational session focused on the team-based implementation of the GINA guidelines. The educational sessions were delivered live with simultaneous streaming via Adobe Connect to allow off-site staff members to login and participate in the educational

session. For staff unable to attend and allow for future use, the educational sessions were recorded and stored on the clinic server. At the completion of the eight educational sessions, the post-test was sent out to the clinic staff via SurveyMonkey link. The final step in the implementation of the project was to disseminate the results of the project to the staff during an all clinic meeting.

### **Measurement Instruments**

To assess for barriers and facilitators experienced by clinical staff, The Barriers and Facilitators to Using Research in Practice tool was adapted to the clinic (Funk, Champagne, Wiese & Tornquist, 1991). This tool has been well studied in nursing and has strong reliability evidenced by Cronbach's alpha and test retest reliability in each of the four factors. A panel of judges established the face and content validity and the factor analysis performed and replicated on the halves of the samples supports the construct validity (Funk et al., 1991). This tool also parallels Roger's model of innovation diffusion to translate research into practice (Carlson, 2009). This tool was used to develop the practice specific questionnaire (Appendix C).

Development of the practice specific questionnaire (Appendix C) assessed current knowledge, practice, practice specific barriers, and role perception regarding team-based asthma management and provided information on department specific practice and role clarity (Upton & Upton, 2006; Weng et al., 2013). To develop this practice specific assessment tool for barriers and facilitators, the DNP student also modified the World Health Organization's (WHO) Hand Hygiene Questionnaire for Healthcare Workers (World Health Organization (WHO), 2009). The WHO outline has been used repeatedly in this fashion and has been found to be a reliable and valid tool to assess department specific needs (WHO, 2009). To ensure reliability and validity, the DNP student had questions evaluated by the Chief of the Department, local experts on role

clarity, and the Director of Ambulatory Care Services (Upton & Upton, 2006; Weng et al., 2013). The questions asked have been determined to be a reliable and valid assessment of barriers and facilitators to practice change and role clarity based on the recommendations in the guidelines and the American Academy of Ambulatory Care.

### **Data Collection Procedures**

The staff members in the clinic were offered the opportunity to participate in the project. Participation was voluntary and staff was given informed consent and information regarding the project prior to beginning the project. The staff was sent the initial survey through SurveyMonkey, and results were used to guide finalization of the educational sessions. At the completion of the educational sessions, the staff were sent the same follow-up survey through SurveyMonkey. The data were analyzed using a pretest-posttest comparison. The post-test results were compared to the pretest results, and the percent change was used to assess effectiveness of the project. The results were also used to provide information on how to improve long-term implementation and integration of the team-based model of care into the clinic. Rogers Diffusion of Innovation Model was used as the theoretical framework to guide implementation which proposes four stages of knowledge acquisition and behavior change. These stages are knowledge, persuasion, decision, and implementation.

**Knowledge.** The clinic staff were exposed to the concepts in the GINA Guidelines, and how these guidelines impact outcomes for the patients and their families. The education addressed why the clinic needs to adopt the changes recommended in the GINA guidelines, through identifying and outlining gaps in asthma treatment with the Chief of Pediatrics. Additionally, the education detailed how each team member is vital to improving the care of pediatric asthma patients. The staff provided feedback on their perceptions of current practices,

and the value of changing current practice. This feedback was used to tailor the educational sessions to the clinic.

**Persuasion.** Educational sessions were developed incorporating staff feedback to educate each staff member on the treatment guidelines and their role in implementation. Staff were educated on what each person's role is and how making a change can benefit the patients and the clinic in the future. The staff began to see how the GINA guidelines could be utilized in the clinic to improve care.

**Decision.** In each session, the staff were given time to ask questions regarding implementation and barriers that they experience. Staff and the clinic leadership worked together to answer the questions posed, such as, "Is this going to cause more work for me?", "How are we going to do this?", "How do we know that this is the right thing to do?", "Why do we need to do it?", "How can we make it happen in our environment?", and "Our system is cumbersome already and adding something new could make it more difficult for us and the patients."

**Implementation.** The final stage of the project will be ongoing, staff members will develop a clear procedure for who does what and EHR templates will be developed and modified to ease implementation and ensure that the clinic is implementing all aspects of the GINA guidelines. Clinicians and staff will work with pharmacy to have quick order sets for medications to increase productivity and ensure that all patients have access to the same level and consistency of care. The staff will create annual order sets for management and follow-up and will develop pre-filled asthma action plans and patient education regarding appropriate use. The staff developed self-management education in conjunction with respiratory therapy to improve long-term outcomes. Both the clinic staff and the respiratory therapy staff assessed how the flow fits

into daily clinic practice, and have made changes where necessary to ease the transition and improve buy in.

### **Ethical Considerations/Protection of Human Subjects**

This DNP project was reviewed by the University of Massachusetts Institutional Review Board (UMASS IRB). Ethical considerations for all study participants included anonymity, protection of survey responses, and ensuring access to evidenced based recommendations that align with best available evidence for managing pediatric asthma in primary care. Ensuring equal access to evidence-based recommendations will allow for equal justice for patients going forward, as the study participants had the knowledge and team structure to provide evidence-based pediatric asthma care.

To ensure protection of anonymity and responses, Survey Monkey was used for dissemination and collection of survey responses. The DNP student was the only person with access to the responses, and all data was collated to protect survey participants. Minimal identifying data was used, and this identifying data collected included time in profession and title. No other identifying information was collected. The Survey Monkey settings were adjusted so that no IP or computer information was collected. No patient data was collected during the project.

No patients were involved in this DNP project. The benefit to the health staff was in ensuring that the education information is up-to-date evidence and is concurrent with community standards of care in pediatric asthma management. To ensure that the educational information was up to date and appropriate it was presented to project mentor and the Chief of Pediatrics prior to the commencement of clinic educational sessions.



### Results/Outcomes

There were eight staff members who participated in the pretest. The respondents included two Pediatricians, one Pediatric Nurse Practitioner, one Registered Nurse, one Licensed Practical Nurse, two Medical Assistants, and one Nursing Assistant. The respondents represented all of the professions in the clinic. The respondents varied in clinical experience ranging from one year of experience to 15 years of experience. The breakdown of clinical experience is listed in Table 2.

Table 2

<i>Length of time in clinical practice</i>	
	Percent of participants
1 year to less than 3 years	12.5
3 years to less than 5 years	37.5
5 years to less than 10 years	12.5
10 years to less than 15 years	37.5
Total	100.0

Table 2 indicates that the most common length of time in clinical practice was three years to less than five years and 10 years to less than 15 years representing 75% of respondents. While one year to less than three years and five years to less than 10 years represented 25% of respondents. These results highlight the range of clinical experience staff in the clinic have.

At the end of the educational sessions, the post-test was sent to the eight staff who participated in the pre-test and the educational sessions. The DNP student compared the pre-and post-intervention results to assess for changes in attitudes, beliefs, barriers, and understanding of their role in team-based care after completion of the education sessions. The percentage of

change from the pre-test to the post-test results were compared to identify areas that improved based on the educational sessions and where the greatest improvements were seen. Additionally, the data showed areas where continued improvement was needed to improve the utilization of the GINA guidelines in the clinic.

Clinic flow is an important factor to consider when integrating new practices into the clinic. The staff's concerns regarding how integrating a team-based model of care using the GINA guidelines was assessed in the survey. The survey asked the participants how they viewed using the team-based approach to the GINA guidelines would affect the clinic flow. Those results are presented in Table 3.

Table 3

*The use of clinical practice guidelines will negatively impact the flow of patient care in the clinic*

	Pre-Test Percent	Post-Test Percent	Percent Change
Strongly Agree	50.0	25.0	25.0
Agree	25.0	25.0	0.0
Neither Agree/Disagree	25.0	25.0	0.0
Disagree	0.0	25.0	50.0
Strongly Disagree	0.0	0.0	0.0
Total	100.0	100.0	

At the beginning of the project, the clinic staff showed concerns for how the flow of the clinic would be negatively impacted through the use of clinic practice guidelines (Table 3). At the end of the educational sessions the staff were still concerned that clinic flow would be negatively impacted if the GINA guidelines were utilized in the clinic. However, there was a

decrease in the percentage of people strongly agreeing that the clinic flow would be negatively impacted by the use of the GINA guidelines in the clinic.

There was also an increase in the percentage of participants who disagree that the clinic flow will be negatively impacted by the use of the clinic practice guidelines in the clinic. These results provide inconclusive evidence to support the use of Roger's Diffusion of Innovation model (Carlson, 2009) to improve clinic staff perception regarding the impact that utilization of the GINA guidelines will negatively impact clinic flow.

Table 4 describes the clinic staff's awareness and knowledge of the recommendations in the GINA guidelines for the management of pediatric asthma. Prior to the educational sessions, none of the clinic staff were aware of the GINA guidelines. During the educational sessions, the staff reported that they had used the Expert Panel Report III (EPR-III) guidelines which were published by the National Heart and Blood Institute in 2002 and updated in 2007 for asthma management.

Table 4

*I am aware of the recommendations in the GINA (Global Initiative for Asthma) guidelines for management of asthma*

	Pre-Test Percent	Post-Test Percent	Percent Change
Strongly Agree	0.0	25.0	25.0
Agree	0.0	50.0	50.0
Neither Agree/Disagree	0.0	25.0	25.0
Disagree	50.0	0.0	50.0
Strongly Disagree	50.0	0.0	50.0
Total	100.0	100.0	

After the educational sessions, 75% of the staff reported they were aware of the recommendations in the GINA guidelines. While 75% of participants reported awareness of the GINA guideline recommendations, 25% of participants reported that they neither agreed nor

disagreed with being aware of the GINA guideline recommendations. These results support the use of Roger's Diffusion of Innovation model (Carlson, 2009) as a method for increasing clinic staff knowledge of guideline recommendations, however, more time may be needed to ensure all clinic staff are able to provide a thorough awareness of the GINA guideline recommendations. This outcome met the objective of having a 10% increase in the staff's knowledge of the GINA guideline recommendations.

Table 5 investigates the clinic staff's beliefs regarding how the use of evidence-based guidelines will impact patients with asthma. To effectively incorporate clinical practice changes into the clinic it is essential that clinic staff find value in the new clinical practices. Outcome measures are an important metric for ensuring high quality care is provided to patients. Assessing staff's perception of how the use of a team-based approach to the GINA guidelines will affect patient outcomes is an essential component of integrating changes in the clinic

Table 5

*The use of the evidence-based guidelines will improve the outcome of patients with asthma*

	Pre-Test Percent	Post-Test Percent	Percent Change
Strongly Agree	0.0	25.0	25.0
Agree	25.0	50.0	25.0
Neither Agree/Disagree	37.5	12.5	25.0
Disagree	37.5	12.5	25.0
Strongly Disagree	0.0	0.0	0.0
Total	8	100.0	100.0

At the beginning of the of the study, only 25% of respondents thought that using the GINA evidence-based guidelines would improve outcomes for patients with asthma. After the educational sessions, 75% of respondents either agreed or strongly agreed that using evidence-based guidelines would improve the outcomes of patients with asthma. The results post-test

improvement supports using Roger's Diffusion of Innovation model (Carlson, 2009) to affect how clinic staff view the use of evidence-based guidelines to improve patient outcomes.

However, during the discussion portions of the educational sessions, the staff indicated they did not have all of the tools needed to successfully implement the guideline recommendations. The staff stated that there were no educational materials available for the patients or staff, there were no standardized Asthma Action Plans in the clinic, some clinic rooms lacked Peak Flow Meters, staff were unaware that respiratory therapy had the ability to perform Pulmonary Function Testing, there was inconsistent diagnosis of asthma severity, inconsistent use of controller medications by staff and patients, and no standards for assessing asthma control utilizing an evidence based instrument. The results from the pretest/posttest in conjunction with the responses during the question and answer sessions indicate while education is important, there are other factors that will also need to be addressed for successful long-term implementation of evidence-based practices in the clinic.

Table 6 presents clinic staffs' use of the GINA practice guidelines for managing pediatric asthma. This assessment focused on how providing education and structure for implementation of the GINA guidelines affects use of the guidelines in the clinic.

Table 6

*I use the GINA practice guidelines in my practice for managing asthma care*

	Pre-Test Percent	Post-Test Percent	Percent Change
Strongly Agree	0.0	0.0	0.0
Agree	0.0	25.0	50.0
Neither Agree/Disagree	0.00	50.0	25.0
Disagree	50.0	25.0	25.0
Strongly Disagree	50.0	0.0	50.0
Total	100.0	100.0	

The pre-test results indicated that none of the clinic staff were actively using the GINA practice guidelines to manage their patient's asthma. After the educational sessions, 25% of the respondents indicated that they were using the GINA practice guidelines to manage asthma. However, 50% of the respondents that they neither agreed nor disagreed that they were using the GINA practice guidelines to manage asthma.

These results were investigated further during the question and answer sessions, and staff indicated that they were trying to use the GINA guidelines in practice but several barriers in the clinic structure, support, and Electronic Health Record (EHR) documentation prevented thorough and consistent use of the guidelines. While these findings were inconclusive to support the use of Roger's Diffusion of Innovation model (Carlson, 2009) to improve use of guidelines in clinic practice through education and implementation; the results indicate that while staff desire to use the guidelines, there are other factors that influence thorough and consistent use of the recommendations in a clinic. This finding is supported by the staff's interactions during the question and answer periods when they indicated that they do not have all of the support, infrastructure, and tools necessary to consistently and thoroughly implement the GINA guidelines in the clinic.

Table 7 presents the clinic staff's thoughts regarding knowledge of best practices for asthma management in the clinic. This question was used to assess whether clinic staff perceive a knowledge gap for providing evidence based pediatric asthma care. Assessing for a knowledge gap is imperative for ensuring that clinic staff have up-to-date evidence to manage pediatric asthma. This question did not specifically assess the knowledge of the GINA guidelines, but served as general assessment regarding a knowledge gap in clinical practice.

Table 7

*There is a lack of knowledge regarding best practices for management of asthma in the clinic*

	Pre-Test Percent	Post-Test Percent	Percent Change
Strongly Agree	25.0	0.0	25.0
Agree	37.5	12.5	25.0
Neither Agree/Disagree	25.0	0.0	25.0
Disagree	12.5	75.0	62.5
Strongly Disagree	0.0	12.5	12.5
Total	100.0	100.0	

At the beginning of the project, the clinic staff were fairly evenly split on knowledge of asthma management best practices. After the educational sessions, 87.5% of participants disagreed that there was a lack of knowledge regarding best practices for management of pediatric asthma. This finding supports the use of Roger's Diffusion of Innovation model (Carlson, 2009) to improve clinic staff knowledge of best practices for asthma management. However, during the educational sessions, lack of consistent clinic leadership and engagement was identified by participants as a major factor in ensuring knowledge of best practices.

Table 8 presents clinic staff perceptions regarding clinic leaderships' interest in incorporating evidence-based practices for managing asthma into the clinic. This question aimed to highlight the importance of an engaged leadership team in incorporating a team-based approach to asthma care.

Table 8

*The leadership of the clinic is interested in incorporating evidence-based practice for managing asthma into the clinic*

	Pre-Test Percent	Post-Test Percent	Percent Change
Strongly Agree	0.0	0.0	0.0
Agree	12.5	25.0	12.5
Neither Agree/Disagree	25.0	37.5	12.5
Disagree	37.5	25.0	12.5
Strongly Disagree	25.0	12.5	12.5
Total	100.0	100.0	

Prior to the educational sessions, only 12.5% of respondents thought that clinic leadership was interested in incorporating evidence-based practices into the clinic to manage asthma. The educational sessions did not provide much change as to how the clinic staff viewed clinic leaderships interest in incorporating evidence-based practices into the clinic. The results did meet the goal of a 10% increase in perceptions of leadership interest in incorporating evidence-based practices into the clinic. However, the small sample size does not support the use of Roger's Diffusion of Innovation model (Carlson, 2009) to impact how clinic staff view clinic leaderships interest in incorporating evidence-based practices into the clinic. These results were addressed during the educational sessions, when clinic staff indicated that they were upset that most of the clinic leadership was not participating in the project. Several staff members expressed their desire to have clinic leadership engaged, and thought that the project would be more successful if all of the clinic leadership participated in the sessions.

Table 9 highlights the participant views of how supportive team members are of a team-based approach to asthma. Team member support is necessary for successful implementation of team-based asthma care. Identifying areas for improving team support was essential for success of the project. The educational sessions focused on improving clarity and communication for the



team members to improve the incorporation of the GINA guideline recommendations in the clinic.

Table 9

*Team members are supportive of a team-based approach to asthma management*

	Pre-Test Percent	Post-Test Percent	Percent Change
Strongly Agree	0.0	0.0	0.0
Agree	0.0	25.0	25.0
Neither Agree/Disagree	37.5	37.5	0.0
Disagree	12.5	37.5	25.0
Strongly Disagree	50.0	0.0	50.0
Total	100.0	100.0	

At the beginning of the project, the only team members actively involved in management of asthma and other chronic conditions were the providers (MDs and NPs). The pre-test results indicated that none of the staff felt like other team members were supportive of a team-based approach to asthma. The results of the post-test indicated that 25% of respondents thought that other team members were supportive of a team-based approach to asthma.

These results were also discussed during the educational sessions. The staff felt that while the participants in the educational sessions were supportive of a team-based approach, other clinic staff were not supportive of this approach. Many of the staff members expressed a desire to have other disciplines, such as respiratory therapy and pharmacy, also involved in the team-based asthma management approach. While the results from the project do not show large improvements in how the participants viewed how supportive other team members are of a team-based approach; the results support the use of Roger's Diffusion of Innovation model (Carlson, 2009), as the staff are engaging and assessing how the use of the guidelines can be sustained long term.

Table 10 presents respondent's interest in using evidence-based clinical practice guidelines for managing asthma. Assessing interest in incorporating the GINA guideline recommendations helps identify factors other than knowledge gaps and support as a barrier or facilitator to integrating changes into clinical practice.

Table 10

*I am not interested in using evidenced based clinical practice guidelines for managing asthma*

	Pre-Test Percent	Post-Test Percent	Percent Change
Strongly Agree	0.0	0.0	0.0
Agree	12.5	0.0	12.5
Neither Agree/Disagree	25.0	12.5	12.5
Disagree	62.5	50.0	12.5
Strongly Disagree	0.0	37.5	37.5
Total	100.0	100.0	

At the beginning of the project, 12.5% of participants indicated that they were not interested in using evidence-based clinical practice guidelines for managing asthma. After the educational sessions, none of the participants indicated that they were not interested in using evidence-based clinical practice guidelines.

This result indicates that the clinic staff are interested in using clinic practice guidelines. These results do not support the use of Roger's Diffusion of Innovation model (Carlson, 2009) to impact staff's interest in utilizing evidence-based clinical practice guidelines to manage pediatric asthma. Clinic staff indicated during the educational sessions that they had all been trained in school or during continuing education on the importance of using evidence-based medicine. The participants indicated that they all want their patients to be the healthiest they can be, but they can get confused by conflicting evidence and leadership priorities.

Table 11 presents staff's perception of support to effectively provide evidence-based asthma care in the clinic. This question did delineate a difference between peer support, leadership support, or other outside factors that may impact perception of support. This question was aimed at identifying whether or not providing role clarity and education impacts perceptions of support.

Table 11

*I have support to effectively provide evidence-based asthma care in the clinic*

	Pre-Test Percent	Post-Test Percent	Percent Change
Strongly Agree	0.0	0.0	0.0
Agree	0.0	25	25.0
Neither Agree/Disagree	12.5	37.5	25
Disagree	75.0	37.5	37.5
Strongly Disagree	12.5	0.0	12.5
Total	100.0	100.0	

The pre-test results indicate that 87.5% of participants did not feel they had support to effectively provide evidence-based asthma care in the clinic. After the educational sessions, 37.5% of participants said they did not have support to effectively provide evidence-based asthma care in the clinic. While this result indicates a 50% reduction in those stating that they do not have the support to provide evidence-based asthma care, only 25% of respondents reported having the support they need to provide evidence-based asthma care in the clinic. The topic of clinic support to provide evidence-based asthma care in the clinic was discussed during the question and answer sessions, and many of the staff indicated a desire to have more leadership support and support from other departments, such as respiratory therapy and pharmacy. While these results support the use of Roger's Diffusion of Innovation model (Carlson, 2009), the

discussion sessions indicate that there are other factors which influence how staff can have the most effective support to provide evidence-based care in the clinic.

Table 12 presents the participants' perception regarding need to change clinic practice. Assessing for need to change is a powerful method to assess whether or not a change will be successful when it is implemented. According to Roger's Diffusion of Innovation Model (Carlson, 2009), a person has to see a need to change in order for change to be implemented long-term.

Table 12

*There is no need to change clinic practice*

	Pre-Test Percent	Post-Test Percent	Percent Change
Strongly Agree	12.5	0.0	12.5
Agree	0.0	12.5	12.5
Neither Agree/Disagree	37.5	12.5	25.0
Disagree	12.5	50.0	37.5
Strongly Disagree	37.5	25.0	12.5
Total	100.0	100.0	

During the pre-test assessment, 12.5% of participants agreed that there was no need to change clinic practice, and 37.5% of participants indicated that they neither agreed nor disagreed that there was no need to change clinic practice. After the educational sessions, 75% of participants indicated there was a need to change clinic practice. These results support the use of Roger's Diffusion of Innovation model (Carlson, 2009) to impact clinic staff's perception of need to change clinic practice. These results support the use of education to impact views on changing current clinic practices. Additionally, during the discussion sessions, the participants highlighted the important role that education and discussion had on their perceptions about implementing a team-based model of care for implementing the GINA guidelines in the clinic.

Table 13 looks at the participant's views of clinic leaderships' support to change clinic practice. Changing current clinical practice requires clarity from leadership for long-term success. Assessing how clinic staff view leadership support is an indicator for how likely staff are to make long-term changes.

Table 13

*There is lack of leadership support to change clinic practice*

	Pre-Test Percent	Post-Test Percent	Percent Change
Strongly Agree	25.0	12.5	12.5
Agree	25.0	12.5	12.5
Neither Agree/Disagree	50.0	62.5	12.5
Disagree	0.0	12.5	12.5
Strongly Disagree	0.0	0.0	0.0
Total	100.0	100.0	

The results from table 13 are consistent with results from table 9. While there is a change in pre-test/post-test results indicating that the educational sessions did have minimal impact on how clinic staff viewed clinic leadership's support to change clinical practice, the majority still felt that they were unsure as to the extent of this support. During the question and answer portions of the educational sessions, the staff consistently stated that they felt all members of the leadership should have participated in the project, and that they should provide more consistent messages with regards to their expectations and support of changes. These results indicate that while Roger's Diffusion of Innovation model (Carlson, 2009) may be an effective method of integrating evidence-based practices into the clinic, there are other factors that also must be addressed for successful long-term change to be sustained. The responses during the discussion sessions indicate that clinic staff desire a strong leadership presence and consistent messaging when changes are proposed in the clinic.

According to Rogers Diffusion of Innovation Model (Carlson, 2009), clinical practice changes are more likely be long lasting when staff feel they have the knowledge and skills to implement the recommendations. Assessing whether or not structured education, role clarity, and discussion can impact perceptions of skills and knowledge is essential in identifying how to improve care in the clinic.

Table 14

*I have adequate skills and knowledge to provide evidence-based asthma care*

	Pre-Test Percent	Post-Test Percent	Percent Change
Strongly Agree	0.0	50.0	50.0
Agree	37.5	25.0	12.5
Neither Agree/Disagree	37.5	25.0	12.5
Disagree	25.0	0.0	25.0
Strongly Disagree	0.0	0.0	0.0
Total	100.0	100.0	

The educational sessions had a positive impact on how staff viewed their skills and knowledge to provided evidence-based asthma care (Table 14). The pre-test results indicated that only 37.5% of clinic staff felt they had adequate skills and knowledge to provide evidence-based asthma care. After attending the educational sessions, 75% of participants either agreed or strongly agreed that they have adequate skills and knowledge to provided evidence-based asthma care. These results support the use of education and Roger's Diffusion of Innovation model (Carlson, 2009) to improve clinic staffs' skills and knowledge regarding use of evidence-based practices for asthma management.

Table 15 presentss staff's perception of team member involvement in team-based asthma care. Assessing the impact of education and discussion on participation is essential in determining how successful long-term implementation of a team-based model of asthma care

may be. Long-term changes are more successful when individuals perceive that they are contributing to outcomes.

Table 15

*Everyone on the team participates in providing care to patients with asthma and their families*

	Pre-Test Percent	Post-Test Percent	Percent Change
Strongly Agree	0.0	12.5	12.5
Agree	0.0	12.5	12.5
Neither Agree/Disagree	12.5	25.0	12.5
Disagree	62.5	50.0	12.5
Strongly Disagree	25.0	0.0	25.0
Total	100.0	100.0	

The educational sessions and implementation had a positive effect on changing the team members' involvement in asthma care (Table 15). Prior to the project, 87.5% of respondents indicated that they disagreed or strongly disagreed that all members of the team participated in providing care to patients with asthma. After the educational sessions and implementation during the project that occurred, 25% of participants agree or strongly agreed that everyone on the team participated in providing care to patients and their families with asthma. This increase met the objective of increasing team involvement in pediatric asthma care by 10%. However, 50% of participants continued to disagree that all team members participated in providing care to patients and their families. These results are consistent with finding from Table 10 and the discussions during the question and answer sessions where staff indicate that they do not feel everyone on the team is supportive of a team-based approach, and that several clinic staff members perceive that pharmacy and respiratory therapy are also integral to successful asthma management.

Table 16 assessed how the felt the educational sessions impacted communication among team members. Communication is important to effective team functioning and long-term success of changes. Communication also impacts how well teams are able to address challenges that occur when incorporating changes into clinic practice.

Table 16

*The team members communicate well with one another*

	Pre-Test Percent	Post-Test Percent	Percent Change
Strongly Agree	0.0	12.5	12.5
Agree	25.0	75.0	50.0
Neither Agree/Disagree	12.5	0.0	12.5
Disagree	50.0	12.5	37.5
Strongly Disagree	12.5	0.0	12.5
Total	100.0	100.0	

The results from the pre-test/post-test results indicate that the educational sessions improved team members' communication with one another (Table 16). Prior to the educational sessions, only 25% of participants indicated that they felt team members communicated well with one another, compared to 87.5% after the educational sessions and period of implementation. At the presentation of the results to the clinic staff, these results were discussed in detail. The staff stated they felt like the in-person educational sessions allowed them to talk together about what they were learning and discuss what they perceived would work and what was still needed for successful long-term implementation of a team-based approach to using the GINA guidelines in the clinic. The staff also reported during the discussions that they were more comfortable speaking up and discussing things with other team members.

The participant's perception of whether a team-based approach to utilizing the GINA guidelines for asthma care would improve outcomes for patients and their families are presented



in Table 17. Assessing for the impact that the educational sessions had on participants' perceptions of whether a team-based approach to implementing the GINA guidelines provided additional information for the clinic leadership to improve implementation of the program in the clinic.

Table 17

*A team-based approach to utilizing the GINA guidelines for asthma care will improve outcomes for patients and their families*

	Pre-Test Percent	Post-Test Percent	Percent Change
Strongly Agree	0.0	62.5	62.5
Agree	37.5	12.5	25.0
Neither Agree/Disagree	50.0	12.5	37.5
Disagree	0.0	12.5	12.5
Strongly Disagree	12.5	0.0	12.5
Total	100.0	100.0	

The results from the pre-test/post-test comparison indicate that the educational sessions using Roger's Diffusion of Innovation model (Carlson, 2009), impacted how staff perceive patient outcomes will be affected by utilizing a team-based approach to implementing the GINA guidelines (Table 17). Prior to the educational session, only 37.5% of participants thought that a team-based approach to utilizing the GINA guidelines would improve outcomes for patients and their families. After the educational sessions, 75% of participants agreed or strongly agreed that a team-based approach to using the GINA guidelines would improve outcomes for patients and their families. During the presentation of the results, this information was used as support for engaging clinic leadership to make changes to existing Electronic Health Record templates and develop a standardized process for asthma follow-up visits.

### **Facilitators and Barriers**

The facilitators to the successful completion of this project were staff engagement, clinic leadership support and engagement with the DNP student, and the rapport the DNP student has with the clinic staff. The staff who participated in this project are dedicated to the success of the clinic and health of the patients. They are also the early adopters described in Roger's Diffusion of Innovation model (Carlson, 2009). They were eager to find ways to improve asthma care in the clinic and were dedicated to providing honest feedback to the DNP student during the question and answer sessions. The leadership of the clinic supported dedicated time for the educational sessions and implementation of what the team members were trying. The leadership was also engaged with the DNP student and available for discussion and development of the project.

The barriers to successful implementation of this quality improvement project included difficulty finding time to educate all team members together, resistance to new ideas that impact clinic flow, developing involvement from all professions regarding team-based care, staff perception of leaderships' dedication to evidence-based practice changes, and clinic understanding that change is difficult for most people and takes time. Additionally, many staff members were working in other facilities to help with disaster relief, which impacted their ability to participate in the surveys and educational sessions. This led to a decrease in the number of participants in the project.

### **Discussion/Interpretation**

The overall impact this Quality Improvement Project had on the use of a team-based approach to implementing the GINA guidelines was positive. The educational sessions improved knowledge of guideline recommendations, staff perception of their skills and knowledge, and staff communication. While the educational sessions aided in the improvement of staff

knowledge and communication most, they also allowed for open discussion surrounding barriers and facilitators of the team-based use of the GINA guidelines in the clinic. The discussions highlighted the importance of leadership engagement, availability of tools and resources for staff and patients including tools for assessment, education, and self-management, highlighted the importance of adequate clinic infrastructure including documentation templates, assessment procedures, diagnostic consistency, and disease management consistency.

The pre-test results to each of the 15 questions were analyzed and the results indicated that there was concern over clinic flow (Table 4), there was little knowledge regarding the GINA guidelines (Table 5), feelings that evidence-based care may not improve patient outcomes (Table 6), there was lack of leadership involvement and support to incorporate evidence-based practice (Table 9 and Table 14 ), there was lack of support from the team (Table 10), and overall the communication was poor (Table 17). The findings from the pre-test support that there is often lack of knowledge and multiple challenges faced when implementing evidence-based changes in practice. The findings are consistent with the need for increasing knowledge of evidence-based recommendations using the theoretical framework proposed in Roger's Diffusion of Innovation model (Carlson, 2009). The effectiveness of this framework was evaluated using the pre-test post-test comparison results.

The post-test results indicated using Roger's Diffusion of Innovation model as a framework to implement a team-based model of care using the GINA guidelines is effective at improving knowledge, skills, communication between team members, and perceptions that the guidelines will improve outcomes. The model does not improve perceptions of leadership engagement and interest in changing current clinical practices. This may be due to lack of leadership participation in the educational sessions and inconsistent messaging in the clinic.

The discussion sessions highlight the importance of a multi-faceted approach to changing clinical practices in the clinic. They highlighted the staff's desire to improve patient outcomes and engage other people across the campus that provide necessary interventions for pediatric patients with asthma. Open discussions also allowed the participants to bounce ideas off of each other, further building effective communication skills.

The question and answer sessions allowed the staff to explore and voice their desire to have more involvement from Respiratory Therapy and Pharmacy to provide comprehensive assessment and care to the patients and their families. Future educational efforts to emphasize clinic leadership involvement, along with involvement from other professional disciplines, if available, should continue. Incorporating clinic leadership and other professional disciplines could improve the long-term sustainability of the team-based approach to GINA guideline implementation.

The impact of poorly controlled pediatric asthma is extensive. Poorly controlled asthma leads to a high number of missed school days, negatively impacted quality of life for the patient and the family, missed work days for family members, and increases overall healthcare costs through increased Emergency Room visits and inpatient hospitalizations for asthma exacerbations. The use of evidence-based clinic practice guidelines improves asthma management and decreases the burden of asthma on the patient, family, and healthcare systems. Using Roger's Diffusion of Innovation model (Carlson, 2009) is an effective method for team-based implementation of the GINA guidelines in the clinic setting. However, additional factors that impact long-term sustainability of the team-based model cannot be ignored.

Based on the results from this quality improvement project, the clinic has begun to address the staff's responses during the educational sessions. The leadership of the clinic has

engaged the participants to better understand what specific concerns they have that can be addressed. The clinic has developed their own unique clinic-specific asthma action plan, standardized use of Peak Flow Meters, standardized patient and family education to support self-management, and provider “cheat sheets” for accurate asthma diagnosis based on the GINA guidelines. The staff have developed clinic processes to accurately and consistently assess asthma control without significant impact on clinic flow.

Additionally, the leadership has met with the Respiratory Therapy Department (RTD) and a pediatric pharmacist to provide more comprehensive education and treatment options. The Respiratory Therapy Department has provided written materials to aid the clinic staff in understanding pulmonary function testing, and they have begun providing education to patients and their families on the use of spaces and their importance in asthma control. The pharmacist has begun to work with the clinic to develop a “Smart Template” to help streamline and standardize documentation, diagnosis, and management in the clinic. These steps along with the continued staff investment increase the opportunity for long-term sustainability and integration of the GINA guidelines into the clinic.

### **Conclusion**

Pediatric asthma is a complex chronic condition with multiple factors, which contribute to symptom assessment and control, diagnosis, exacerbations, and management. The most comprehensive guidelines are the Global Strategies for Asthma Management and Prevention (GINA, 2016). These guidelines focus not only on pharmacologic but also non-pharmacologic treatments and management strategies. The guidelines stress the importance of self-management strategies, symptom directed treatment with frequent assessments of control, medication adjustments, environmental interventions, and reassessment (GINA, 2016).

The guidelines break up the treatments by age and severity of disease while establishing a framework for the provider to deliver the most comprehensive evidence-based treatment programs for patients (GINA, 2016). High levels of research support the recommendations in the guidelines. Each of the recommendations has strong levels of support in peer-reviewed studies. The gaps in research have been identified, and the guidelines also address the current clinical practices that are not supported by evidence.

The GINA guidelines recommend utilizing a team-based approach to asthma care for the most effective improvement in outcomes and functioning (GINA 2016). Research supports using a multi-disciplinary approach to asthma assessment and management to reduce social, economic, and health burdens related to pediatric asthma. However, integrating new assessment and management strategies in a clinic is challenging. The first step in making clinic practice changes was to assess for barriers and facilitators to change through education and discussion.

Using the Roger's Diffusion of Innovation Model as a framework for integrating changes in the Pediatric Department was an effective framework from which to start the implementation of the team-based model of care using the GINA guidelines. Using this model effectively identifies barriers and facilitators to change and allows for open discussions which allows the staff to identify what is going to be most impactful and important for the clinic. This model also highlights the importance of a strong leadership and open communication for long-term success, which have been identified as barriers to success.

Creating and sustaining team-based asthma management in the clinic utilizing the GINA guidelines has the potential to vastly improve the health of pediatric patients with asthma. Effective management of pediatric asthma will reduce the long-term impacts of uncontrolled asthma, not only on patients and their families, but also on the healthcare system. Supporting a

team-based model of care improves long-term outcomes for pediatric patients with asthma and is instrumental in reducing health disparities, healthcare costs, and the economic burden of pediatric asthma. The Roger's Diffusion of Innovation Model could be used in the future to improve care delivery for other chronic conditions in the pediatric clinic, as well as other clinics. This model was effective at addressing participants reservations about team-based care utilizing the GINA guidelines. Integrating evidence-based practices into a clinic practice is an important step to decreasing health disparities and healthcare costs across the United States.

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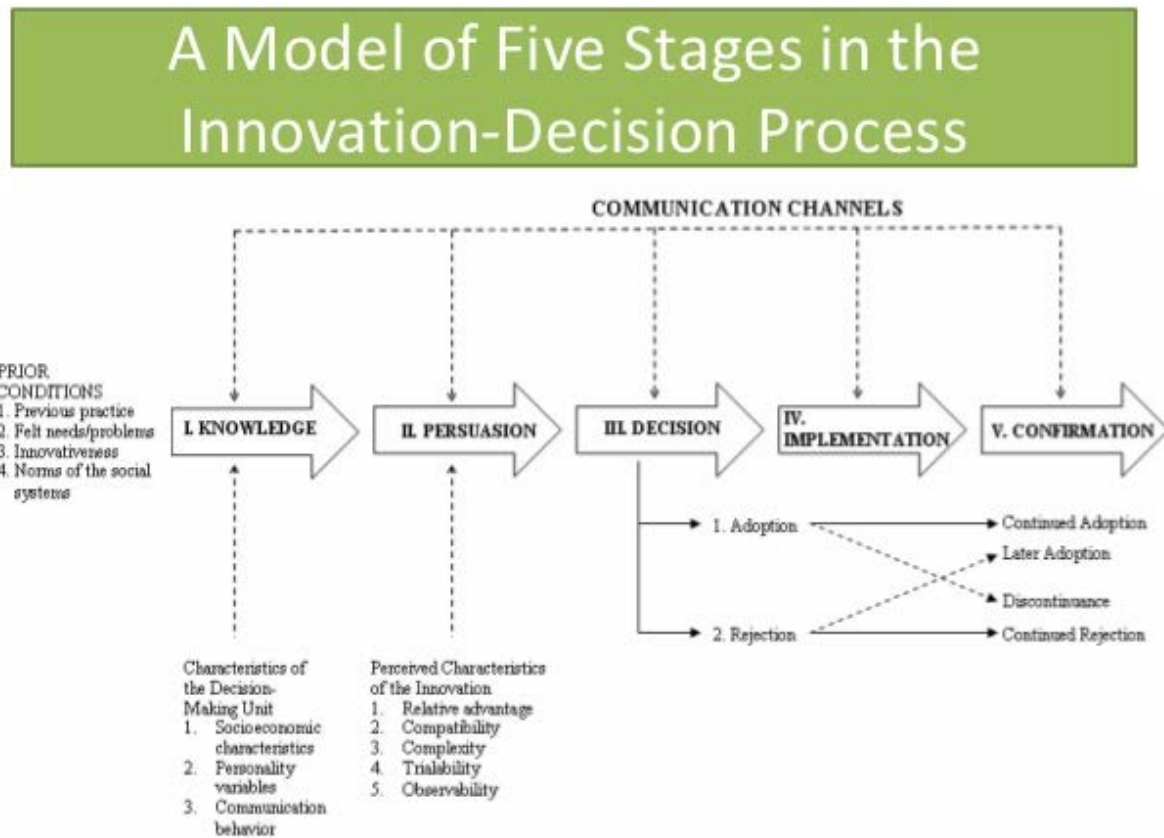
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### Appendix A: Theoretical Framework



(Carlson, 2009)

Table A.1 *Stages of the Knowledge to Action Cycle*

Stage	Definition
Knowledge	Individual is exposed to new information, innovation, guideline, process but lacks complete information
Persuasion	Individual becomes interested in the new idea and thinks that the new guideline, process, innovation could improve outcomes, and seeks additional information
Decision	Individual applies new information to his/her present and anticipated future situations and then decides whether to try it. The staff see the benefit in changing current clinic practices.
Implementation	Full use of innovation, change, clinical proactive guideline in the clinic setting
Confirmation	Continued use of full innovation, guideline, process in the clinic

**Appendix B: Educational Sessions**

<b>Session Number</b>	<b>Topic</b>
Session 1	<b>Introduction to Pediatric Asthma</b> What is Asthma Why is it Important How does asthma impact patients and their families?
Session 2	<b>Social determinants in Pediatric Asthma</b> Housing Poverty Access to care Health Literacy
Session 3	<b>The Global Initiative for Asthma</b> What do the Guidelines Recommend? Who has a role in asthma management?
Session 4	<b>Team Based Care in Pediatric Asthma</b> Clinic Flow Documentation Who does what and when Who is “on the team?”
Session 5	<b>Supporting Self-Management in Pediatric Asthma</b> Patient education Family education Strategies for improving self-management
Session 6	<b>Medications for Pediatric Asthma</b> Severity based Diagnosing severity Step up vs step down
Session 7	<b>Improving Outcomes in Pediatric Asthma</b> Asthma Action Plans Peak Flows Social support Follow up
Session 8	<b>Putting it all Together</b> Now what? Making the change Owning my role in asthma care



**Appendix C: Questionnaire****Clinical Practice Guideline Adoption Questionnaire**

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1. The use of clinical practice guidelines will negatively impact the flow of patient care in the clinic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I am aware of the recommendations in the GINA (Global Initiative for Asthma) guidelines for management of asthma	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The use of the evidence-based guidelines will improve the outcome of patients with asthma	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I use the GINA practice guidelines in my practice for managing asthma	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. There is a lack of knowledge regarding best practices for management of asthma in the clinic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. The leadership of the clinic is interested in incorporating evidence-based practice for managing asthma into the clinic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Team members are supportive of a team-based approach to asthma management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I am not interested in using evidence based clinical practice guidelines for managing asthma	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I have support to effectively provide evidence-based asthma care in the clinic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. There is no need to change clinic practice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. There is lack of leadership support to change clinic practice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I have adequate skills and knowledge to provide evidence-based asthma care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Everyone on the team participates in providing care to patients with asthma and their families	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. The team members communicate well with one another	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. A team-based approach to utilizing the GINA guidelines for asthma care will improve outcomes for patients and their families	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

I am a/an: **please choose profession**

I have been in my profession: **years in profession**

**Appendix D:** Permissions



Brandy Cloud &lt;brandy.cloud@gmail.com&gt;

---

**RE: GINA MAIN CONTACT FORM**

1 message

---

**Rebecca Decker** <goldandgina@gmail.com>  
To: brandy.cloud@gmail.com

Tue, Jun 27, 2017 at 5:45 AM

Hello,  
Thank you for your message and for your interest in GINA. Permission is granted for this request.

Rebecca Decker  
Program Director, GOLD and GINA  
Global Initiative for Chronic Obstructive Lung Disease  
Global Initiative for Asthma  
P.O. Box 558  
Fontana, WI 53125  
Mobile: 262-812-6741  
email: [goldandgina@gmail.com](mailto:goldandgina@gmail.com)

[www.goldcopd.org](http://www.goldcopd.org) @gold\_copd  
[www.ginasthma.org](http://www.ginasthma.org) @ginasthma

-----Original Message-----

From: Brandy Cloud [mailto:[wordpress@ginasthma.org](mailto:wordpress@ginasthma.org)]  
Sent: Monday, June 26, 2017 10:42 AM  
To: [goldandgina@gmail.com](mailto:goldandgina@gmail.com)  
Subject: GINA MAIN CONTACT FORM

Brandy Cloud

[brandy.cloud@gmail.com](mailto:brandy.cloud@gmail.com)

United States

Using the GINA guidelines for a QI project

I would like permission to use the GINA guidelines for a QI project for my DNP project with University of Massachusetts Amherst. I will not be reproducing any of the tables or figures. I will be providing education to the staff about the recommendations and how to implement the recommendations in the clinic. Thank you for your consideration.  
Brandy Cloud

--

This e-mail was sent from a contact form on GINA (<http://ginasthma.org>)



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## AGREEMENT TO USE THE BARRIERS SCALE

I agree to the conditions included in the document "Permission to use the BARRIERS Scale"

Name: Brandy Cloud

Title: Nurse Practitioner/

Academic/business affiliation: University of Massachusetts Amherst

E-mail address: brandy.cloud@gmail.com

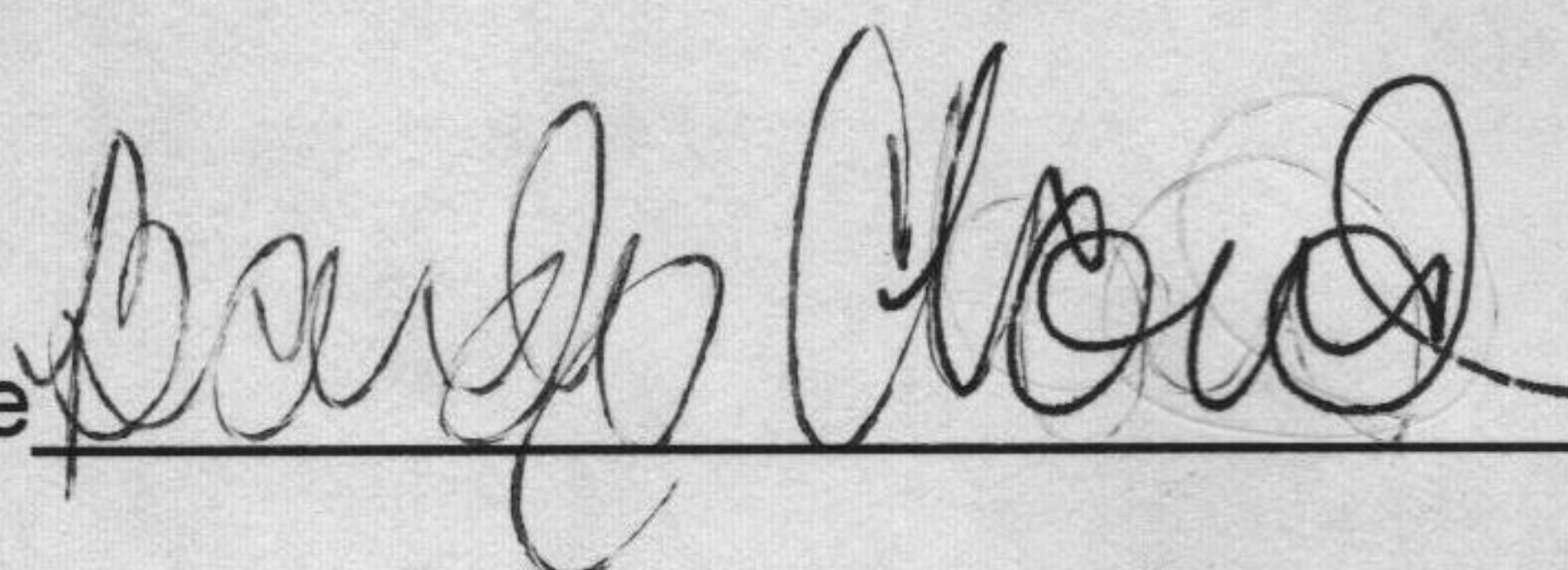
Postal Address: 6466 S. Claiborne Ave Gilbert AZ 85298

Phone Number: 615-339-4054

Study Title: Care Team Utilization of the GINA Guidelines to Improve Quality of Pediatric Asthma Care

Brief Description of Study:

Quality Improvement DNP project evaluating the barriers to the use and implementation of the GINA guidelines for team based care to improve pediatric asthma care.

Signature  Date 6-26-17

E-mail to:  
sfunk@unc.edu

Please keep a copy of this form in your files. You automatically have permission to use the scale and do not need a response from the authors.